REMARKS

Claims 1-20 are pending in this application and stand rejected. Claims 1-7, 21, 14 and 19 have been amended. Claims 1 and 4 are independent. No new matter has been entered and Applicants respectfully request reconsideration in light of the arguments set forth below.

Rejection Under 35 U.S.C. 112, Second Paragraph

Claims 1-20 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of Applicants' invention. According to the Examiner, "[n]one of the claims define the boundary of the first resonator having a length of 0.8mm, 1.0mm or 1.5mm; thereby it is not clear where within the laser system the first resonator is located." Applicants respectfully traverse this rejection and submit the following arguments in support thereof.

Amended claim 1 recites "a semiconductor laser unit including an internal laser resonator" (lines 3-4) and that "the internal laser resonator has a length of at least 0.8mm" (lines 8-9). Claim 2, dependent upon claim 1, recites that "the internal laser resonator has a length of at least 1.0mm" and claim 3, also dependent upon claim 1, recites "the internal laser resonator has a length of at least 1.5mm." Support for the claimed embodiments can be found in the specification at p. 5, line 25- p. 6, line 4 (0.8mm) and at p. 7, lines 5-8 and p. 14, lines 8-15 (1.0mm and 1.5mm).

Thus, the claimed boundaries of the (i.e. semiconductor laser) resonator have been clearly and properly defined and Applicant believes that claims 1-20 are allowable. Applicant therefore, respectfully requests reconsideration and withdrawal of the rejection of claims under 35 USC § 112, second paragraph.

Rejection Under 35 U.S.C. 102

Claims 1-20 were rejected under 35 USC 102 as being anticipated by Ishikawa et al. (U.S. Patent No. 6,058,126), hereinafter "Ishikawa." Applicants respectfully traverse this rejection and submit the following arguments in support thereof.

The Examiner has stated that figure 1 of Ishikawa illustrates: a laser system having a semiconductor laser unit (11a), which provides a pump beam of 797 nm; a solid state gain medium of Nd:YLF (11c), a second harmonic generator crystal (11d) a reflection coating (11c') and an output mirror (11e) and that the laser system of figure 1 provides a first resonator between the output mirror (11e) and the semiconductor laser unit (11a), which is greater than .8 mm and a second resonator between the output mirror and the reflection coating (11c') (emphasis added). The Examiner has also stated that the reflection coating and the output form the resonators where the reflection coating provides reflection to the beam produced by the solid state gain medium and antireflection to the pumped beam of the semiconductor laser unit and that the output mirror (11e) provides output for the second harmonic generated beam and provides reflection to the beam produced by the solid state gain medium.

Ishikawa is directed to controlling the electric current that flows into a semiconductor laser in order to reduce the time required for the laser beam that radiates from the resonator (the "rise-up time") to achieve thermal stabilization. Ishikawa is primarily concerned controlling the flow of current to the semiconductor laser in order to achieve this goal.

Ishikawa states that laser-diode-pumped solid state lasers typically operate when the amount of current flowing to the semiconductor laser is sufficient to generate a laser that has high enough intensity to excite (i.e. "pump") the solid laser crystal to "laser oscillation" (col. 6,

line 57-col. 7, line 9). The device described by Ishikawa can operate in a "stand-by" state in which current continues to flow to the semiconductor laser, but in an amount that is insufficient to cause laser oscillation in the solid state crystal. As a result, the solid state laser crystal is pumped, but the device does not output a solid state laser (col. 7, line 60-col 8, line 7). According to Ishikawa, the rise-up time for this device to switch from the stand-by state to the on state is much less that that required for previously known devices, which switch to the on state from the off state (i.e. no current flows to the semiconductor laser at all) (col. 8, lines 57-68).

Unlike Ishikawa, which the Examiner has described as having a first resonator between the output mirror (11e) and the semiconductor laser unit (11a), the first (i.e. semiconductor) resonator is an internal part of the semiconductor laser unit (11). Thus, regardless of whether the light emitted by solid state laser crystal (13) resonates between quarter-wave plate (15) and resonator mirror (14) (more specifically, between outer end surface (15a) and mirror surface (14a)) in second resonator (31) (p. 9, line 26 – p. 10, line), as the Examiner asserts, Ishikawa in no way suggests the aspects of this invention relating to the presence, in the semiconductor laser unit, of an internal resonator, much less an internal resonator having the size claimed.

In the claimed embodiments of the present invention, the first (i.e. semiconductor laser) resonator is an internal part of the semiconductor laser unit (11) (p. 5, lines 17-20), which emits the laser beam that excites the solid state laser crystal (p. 9, line 22). As explained in the specification, increasing the length of the internal resonator substantially increases the ability to dissipate the heat that is generated in the semiconductor laser, which reduces the oscillation wavelength of the semiconductor laser, thereby preventing the oscillation wavelength from

deviating from the absorption band of the solid state laser crystal (p. 5, line 22 –p. 6, line 19). As a result, the present invention provides a semiconductor laser excited solid state laser apparatus that has stable automatic power control and can produce high power laser output, without deteriorating the semiconductor laser unit.

Applicants have amended claims 1 and 4 to emphasize that "first resonator" refers to the internal resonator of the semiconductor laser unit (11). For consistency, claim 4 has been correspondingly amended. Other claims have been conformed.

Applicants believe that claims 1 and 4 are in condition for allowance. Applicants believe that claims 2, 3, 7-13 and 20, dependent upon claim 1 are allowable because claim 1 is allowable and that claims 5, 6 and 14-19, dependent upon claim 4 are allowable because claim 4 is allowable.

As the foregoing illustrates, claims 1-20 of the present application are patentable over Ishikawa. Applicants respectfully request withdrawal of the rejection under 35 USC §102 and allowance thereof of claims 1-20.

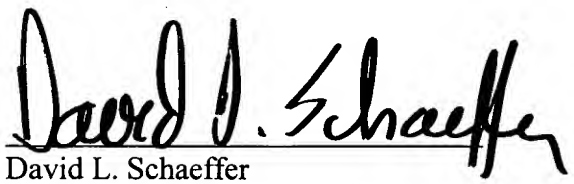
CONCLUSION

Applicants submit that claims 1-20 are allowable for at least the reasons set forth above. In view of the foregoing remarks, Applicants respectfully submit that all outstanding rejections and objections have been addressed and are now either overcome or moot, and that all claims pending in this application are patentable over the prior art. Reconsideration and withdrawal of the rejections is respectfully requested.

No fee is deemed necessary with the filing of this response. However, if any additional fee is required, the Commissioner is hereby authorized to charge the amount of the fee

required and any other fee now or hereafter owed to the undersigned attorney's Deposit Account No. 19-4709. If there are any questions, or if additional information is required, the Examiner is respectfully requested to contact Applicant's attorney at the number listed below.

Respectfully submitted,



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Version With Markings to Show Changes Made

IN THE CLAIMS:

Please amend claims 1-7, 12, 14 and 19 as follows:

1. (Twice Amended) A semiconductor-laser excited solid state laser apparatus comprising:

a semiconductor laser unit including [a first] an internal resonator; and

a solid state laser element which emits laser light in response to excitation light from said semiconductor laser unit;

wherein said [first] internal resonator has a length of at least 0.8 mm, with said [first] internal resonator length being dependent upon a characteristic of said solid state laser element.

2. (Amended) A semiconductor-laser-excited solid state laser apparatus according to claim 1, wherein said [first] internal resonator has a length of at least 1 mm.

3. (Amended) A semiconductor-laser-excited solid state laser apparatus according to claim 1, wherein said [first] internal resonator has a length of at least 1.5 mm.

4. (Twice Amended) A semi conductor-laser excited solid state laser apparatus, comprising:

a semiconductor laser unit including [a first] an internal resonator having a length of at least 0.8 mm;

a solid state laser element which emits laser light in response to excitation light from said semiconductor laser unit.

a [second] solid state laser resonator having a [second] solid state laser resonator length, wherein said [second] solid state laser includes said solid state laser element and a mirror arranged outside of said solid state laser element, with said [first] internal resonator length being independent of said [second] solid state laser resonator length; and

a wavelength conversion element arranged in said [second] solid state laser resonator, which generates a second harmonic wave.

5. (Amended) A semiconductor-laser-excited solid state laser apparatus according to claim 4, wherein said [first] internal resonator has a length of at least 1 mm.

6. (Amended) A semiconductor-laser-excited solid state laser apparatus according to claim 4, wherein said [first] internal resonator has a length of at least 1.5 mm.

7. (Amended) A semi conductor-laser excited solid state laser apparatus as claimed in claim 1 wherein said [first] internal resonator length is dependent upon an absorption band of said solid state laser element.

12. (Amended) A semi conductor-laser excited solid state laser apparatus as claimed in claim 1 wherein said [first] internal resonator length is selected to cause a wavelength of said excitation light to remain within an absorption band of said solid state laser element.

14. (Amended) A semi conductor-laser excited solid state laser apparatus as claimed in claim 4 wherein said [first] internal resonator length is selected based upon an absorption band of said solid state laser element.

19. (Amended) A semi conductor-laser excited solid state laser apparatus as claimed in claim 4 wherein said [first] internal resonator length is selected to cause a wavelength of said excitation light to remain within an absorption band of said solid state laser element.